

Rapid Watershed Assessment

Des Moines Headwaters (MN) HUC: 07100001



Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help land-owners and local leaders set priorities and determine the best actions to achieve their goals.

Introduction

Located in Southwest Minnesota, the Des Moines Headwaters 8-Digit Hydrologic Unit Code (HUC) subbasin lies within the Loess Prairies and Des Moines Lobe portions of the Western Corn Belt Plains Ecoregion.

Approximately ninety six percent of the 801,772 acres in this HUC are privately owned. The remaining acres are state, county or federal public lands, conservancy land or held by corporate interests.

Assessment estimates indicate 1,661 farms in the watershed. Approximately forty two percent of the operations are less than 180 acres in size, forty eight percent are from 180 to 1000 acres in size, and ten percent of farms are greater than 1000 acres in size. The overall average farm size in the basin is seventy eight acres.

The main resource concerns in the watershed are wind and water erosion, sediment and erosion control, drinking and source water protection, animal waste management, nutrient management and wetland management.



County Totals

County	Acres in HUC	% HUC
Lyon	14,210	1.8%
Pipestone	5,241	0.7%
Murray	331,063	41.3%
Cottonwood	106,019	13.2%
Nobles	150,187	18.7%
Jackson	195,051	24.3%
Total acres:	801,772	100%



Physical Description

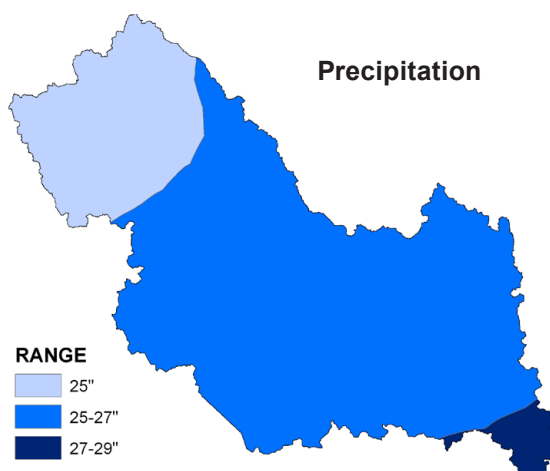
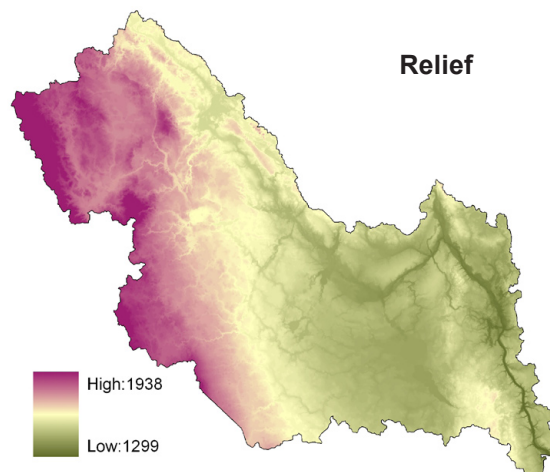
Elevations in the Des Moines Headwaters watershed range from a peak elevation of approximately 1,938 feet above sea level to a low of approximately 1299 feet, with a mean elevation of 1618 feet.

Precipitation in the watershed ranges from 25 to 29 inches each year. Evaporation estimates for the subbasin are between 27 to 31 inches annually.

Soils within this HUC are predominantly highly productive and well suited to agricultural uses. Primary land uses / land covers are Row Crops (81.1%), Grass/Pasture/Hay (5.9%), Residential/Commercial Development (5.9%), and Wetlands (3.1%).

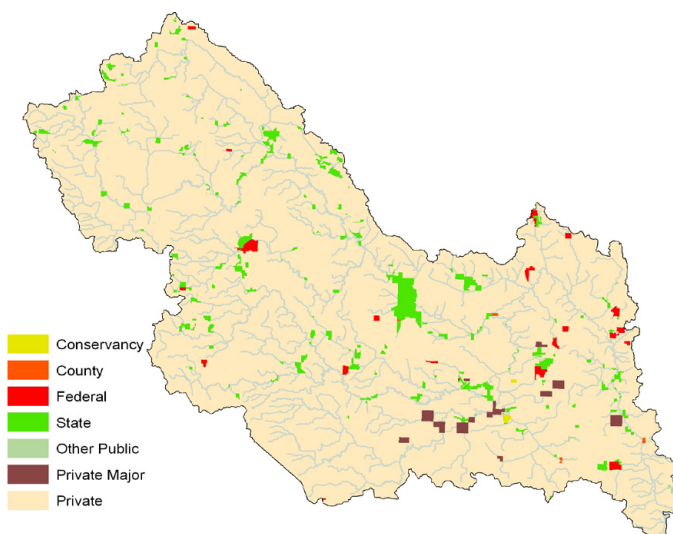
Land use within the watershed is largely agricultural, with rowcrops and pasture/grass lands accounting for approximately 87% of the overall watershed acres.

Development pressure is low to moderate in most areas, with occasional farms, timberland, and shoreline being parceled out for development, recreation or country homes.



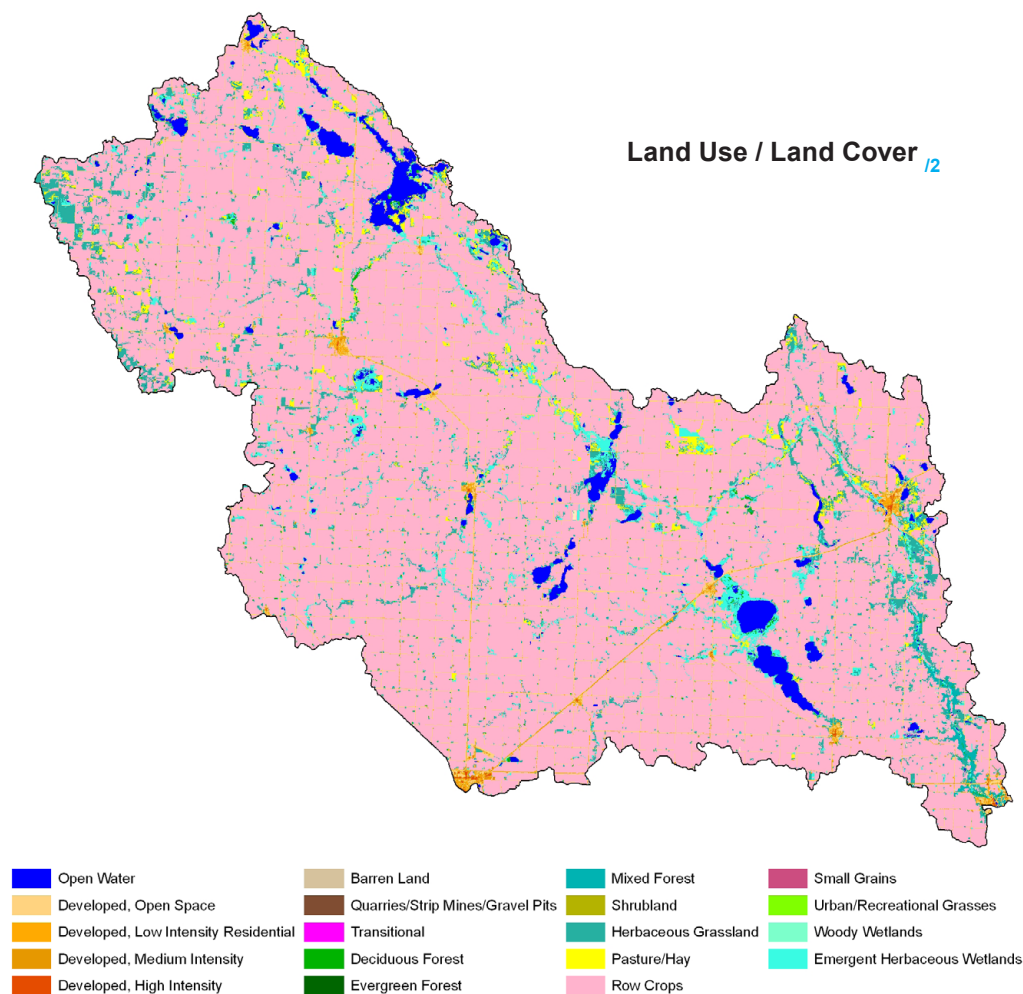
Ownership

Ownership Type	Acres	% of HUC
Conservancy	347	0.04
County	261	0.03
Federal	4,685	0.6
State	23,044	2.9
Other	201	0.0
Tribal	-	-
Private Major	4,702	0.6
Private	768,533	95.9
Total Acres:	801,772	100



Ownership / Land Use

The Des Moines Headwaters watershed covers an area of 801,772 acres. Approximately ninety six percent of the land in the watershed is owned by Private landholders (768,533 acres). The second largest ownership type is State with 23,044 acres (2.9%), followed by Private Major (Corporate), with approximately 4,702 acres (0.6%), Federal with 4,685 acres (0.6%), Conservancy with 347 acres (0.04%), County with 261 acres (0.03%), and Miscellaneous "Other" Public lands amounting to 201 acres (0.02%). Available ownership data indicates no Tribal land holdings in the watershed. Land Use by ownership type is represented in the table below.



Ownership / Land Use ^{/3}

Landcover/Use	Public		Private**		Tribal		Total Acres	Percent
	Acres	% Public	Acres	% Private	Acres	% Tribal		
Forest	714	0.1%	7,489	0.9%	0	0.0%	8,202	1.0%
Grass, etc	7,014	0.9%	40,675	5.1%	0	0.0%	47,689	5.9%
Orchards	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Row Crops	8,007	1.0%	642,333	80.1%	0	0.0%	650,340	81.1%
Shrub etc	18	0.0%	807	0.1%	0	0.0%	825	0.1%
Wetlands	7,995	1.0%	17,204	2.1%	0	0.0%	25,199	3.1%
Residential/Commercial	1,079	0.1%	46,539	5.8%	0	0.0%	47,618	5.9%
Open Water*	3,359	0.4%	18,551	2.3%	0	0.0%	21,910	2.7%
<div style="display: flex; justify-content: space-between; font-size: small;"> * ownership undetermined ** includes private-major </div>								
Watershed Totals:	28,186	3.52%	773,597	96.5%	0	0.0%	801,772	100%

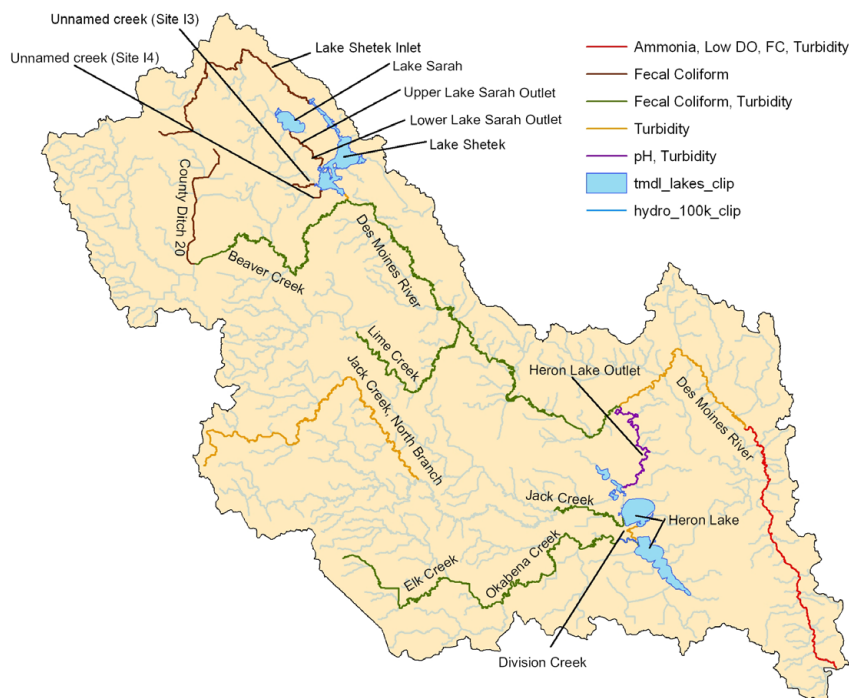
Physical Description (continued)

			cu. ft/sec	
Stream Flow Data	USGS 05476000 DES MOINES RIVER AT JACKSON, MN	2007 Total Avg.	472	
		May-Sep. 2007 Avg.	441	
Stream Data ^{/4} (*Percent of Total HUC Stream Miles)		MILES	PERCENT	
	Total Miles – (100K Hydro GIS Layer)	1,335.8	---	
	303d/TMDL Listed Streams (DEQ)	302.6	3.4%	
Riparian Land Cover/Land Use ^{/5} (Based on a 100-foot buffer on both sides of all streams in the 100K Hydro GIS Layer)	Land Use Type	Acres	Percent	
	Forest	816	2.5%	
	Grain Crops	0	0.0%	
	Grass, etc	4,859	15.1%	
	Orchards	0	0.0%	
	Row Crops	18,434	57.2%	
	Shrub etc	43	0.1%	
	Wetlands	4,695	14.6%	
	Residential/Commercial	1,393	4.3%	
	Open Water*	1,976	6.1%	
	Total Buffer Acres:	32,216	100%	
Crop and Pastureland Land Capability Class ^{/6} (Croplands & Pasturelands Only) (1997 NRI Estimates for Non-Federal Lands)	1 – slight limitations	110,500	16%	
	2 – moderate limitations	426,800	63%	
	3 – severe limitations	105,000	15%	
	4 – very severe limitations	18,200	3%	
	5 – no erosion hazard, but other limitations	2,700	0%	
	6 – severe limitations; unsuitable for cultivation; limited to pasture, range, forest	15,200	2%	
	7 – very severe limitations; unsuitable for cultivation; limited to grazing, forest, wildlife habitat	2,200	0%	
	8 – miscellaneous areas; limited to recreation, wildlife habitat, water supply	1,600	0%	
	Total Crop/Pasture land	682,200	-	
Irrigated Lands ^{/7} (Adjusted 2002 NASS Irrigated Cropland Totals)	TYPE OF LAND	Acres	% of Crop Lands	% of HUC
	Cultivated Cropland / Pastureland	4850	7.1%	6.0%
	Uncultivated Cropland	0	0%	0%
	Total Irrigated Lands	4850	7.1%	6.0%

Assessment of Waters

Section 303(d) of the Clean Water Act states that water bodies with impaired use(s) must be placed on a state's impaired waters list. A water body is "Impaired" or polluted when it fails to meet one or more of the Federal Clean Water Act's water quality standards. Federal Standards exist for basic pollutants such as sediment, bacteria, nutrients, and mercury.

2006 TMDL Listed Waters - Des Moines Headwaters⁸



Listed Waterbody	Impairment	Affected Use
Des Moines River Windom Dam to Jackson Dam	A, DO, FC, T	Aquatic Life and Aquatic Recreation
Lake Shetek Inlet Headwaters to Lk Shetek	FC	Aquatic Recreation
Beaver Creek CD 20 to Des Moines R	FC, T	Aquatic Life and Aquatic Recreation
County Ditch 20 Headwaters to Beaver Cr	FC	Aquatic Recreation
Jack Creek, North Branch Headwaters to Jack Cr	T	Aquatic Life
Okabena Creek Elk Cr to South Heron Lk	FC, T	Aquatic Life and Aquatic Recreation
Elk Creek Headwaters to Okabena Cr	FC, T	Aquatic Life and Aquatic Recreation
Lower Lake Sarah Outlet First Unnamed Cr on Lk Sar	FC	Aquatic Recreation
Jack Creek JD 26 to Heron Lk	FC, T	Aquatic Life and Aquatic Recreation
Upper Lake Sarah Outlet Lk Sarah outlet to first U	FC	Aquatic Recreation
Unnamed creek (Site I3) Outlet at Southwest Lk She	FC	Aquatic Recreation
Unnamed creek (Site I4) Outlet at Southwest Lk She	FC	Aquatic Recreation
Des Moines River Heron Lk Outlet to Windom Dam	T	Aquatic Life
Heron Lake Outlet Heron Lk (32-0057-01) to Des Moi	pH, T	Aquatic Life
Division Creek Heron Lk to Okabena Cr	T	Aquatic Life
Des Moines River Lime Cr to Heron Lk Outlet	FC, T	Aquatic Life and Aquatic Recreation
Lime Creek Lime Lk to Des Moines R	FC, T	Aquatic Life and Aquatic Recreation
Des Moines River Jackson Dam to JD #66	T	Aquatic Life
Des Moines River Lk Shetek to Beaver Cr	T	Aquatic Life
Des Moines River Beaver Cr to Lime Cr	FC, T	Aquatic Life and Aquatic Recreation
Lake Heron	Excess nutrients	Aquatic Recreation
Lake Shetek	Excess nutrients	Aquatic Recreation
Lake Sarah	Excess nutrients	Aquatic Recreation

Common Resource Areas⁷⁹

A Common Resource Area (CRA) map delineation is defined as a geographical area where resource concerns, problems, or treatment needs are similar. It is considered a subdivision of an existing Major Land Resource Area (MLRA) map delineation or polygon. Landscape conditions, soil, climate, human considerations, and other natural resource information are used to determine the geographic boundaries of a Common Resource Area (General Manual Title 450 Subpart C 401.21)

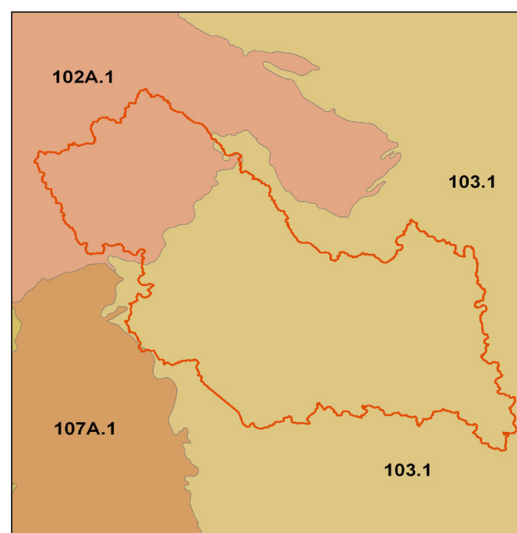
Common Resource Areas are created by subdividing MLRAs by resource concerns, soil groups, hydrologic units, resource use, topography, other landscape features, and human considerations affecting use and treatment needs.



Des Moines Headwaters encompasses three common resource areas, 102A.1, 103.1, and 107A.1.

102A.1 Rolling Till Prairie: Gently sloping to steep, loamy glacial till soils with scattered sandy outwash soils and silty alluvial flood plains soils. This area is part of the Prairie Pothole region of the upper Midwest. Predominantly cropped to corn and soybeans with increasing hayland and pasture and small grains in the western part. Resource concerns are water and wind erosion, nutrient management and water quality.

103.1 Iowa and Minnesota Till Prairies: Primarily loamy glacial till soils with scattered lacustrine areas, potholes, outwash and flood plains. Nearly level to gently undulating with relatively short slopes. Most of the wet soils have been artificially drained to maximize crop production. Primary land use is cropland. Corn, soybeans, sugar beets, peas and sweet corn are the major crops. Native vegetation was dominantly tall grass prairie. Resource concerns are water and wind erosion, nutrient management, and water quality.



Only the major CRA units are described herein.
 For further information, go to:
<http://soils.usda.gov/survey/geography/cra.html>

107A.1 Loess mantled Rolling Prairie Till Plain: Gently undulating to steep soils with long smooth slopes and well defined drainage ways formed in loess mantled uplands. Soils are commonly well drained with some poorly drained upland waterways. Native vegetation was tall and short grass prairie. The primary land use is cropland. Corn and soybeans are the major crops. Resource concerns are water erosion, nutrient management and water quality.

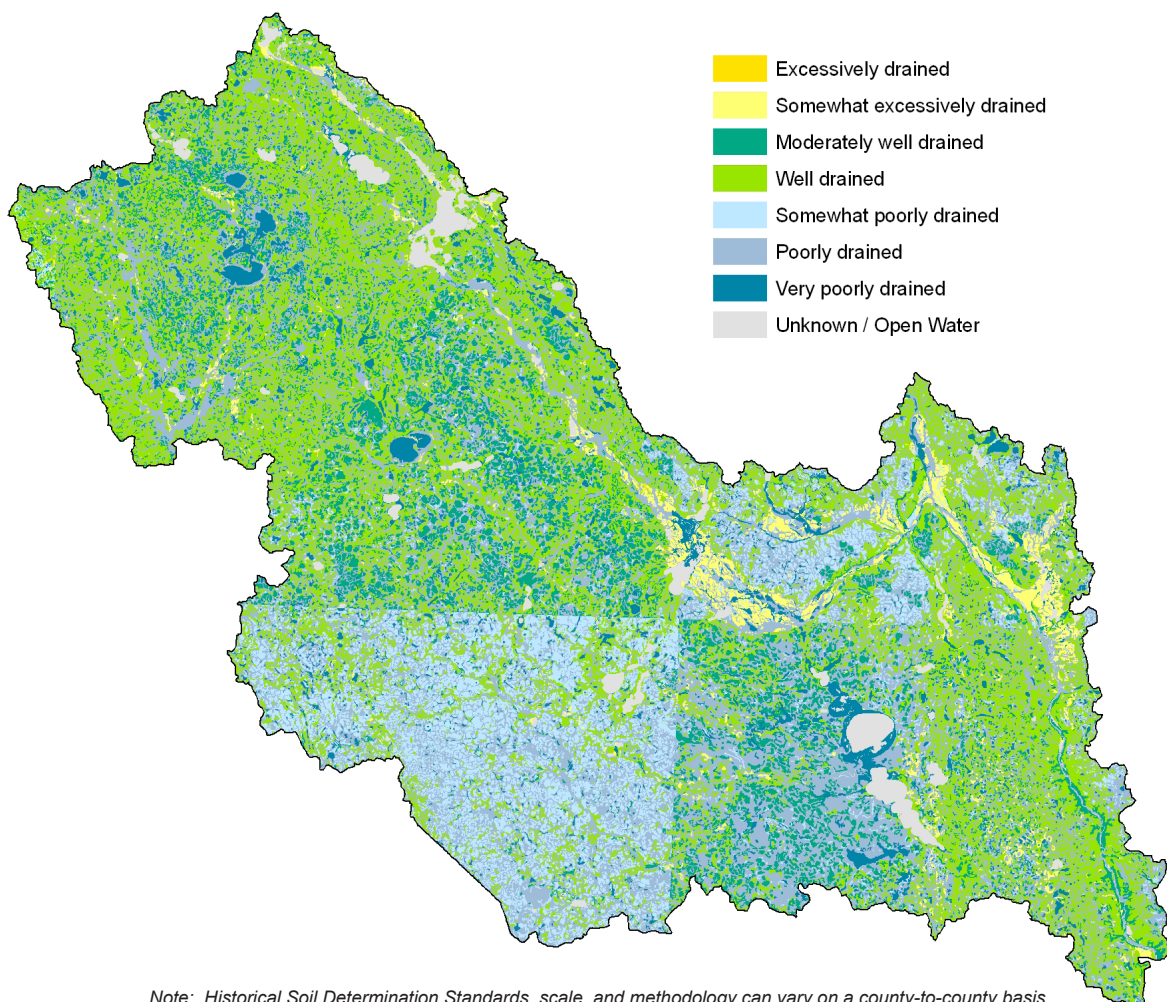
Drainage Classification ^{/10}

Drainage class (natural) refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil.

Seven classes of natural soil drainage are recognized—excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. These classes are defined in the “Soil Survey Manual.”



Visit the online Web Soil Survey at
<http://websoilsurvey.nrcs.usda.gov> for official and
 current USDA soil information as viewable maps and
 tables. Visit the Soil Data Mart at
<http://soildatamart.usda.gov> to download SSURGO
 certified soil tabular and spatial data.



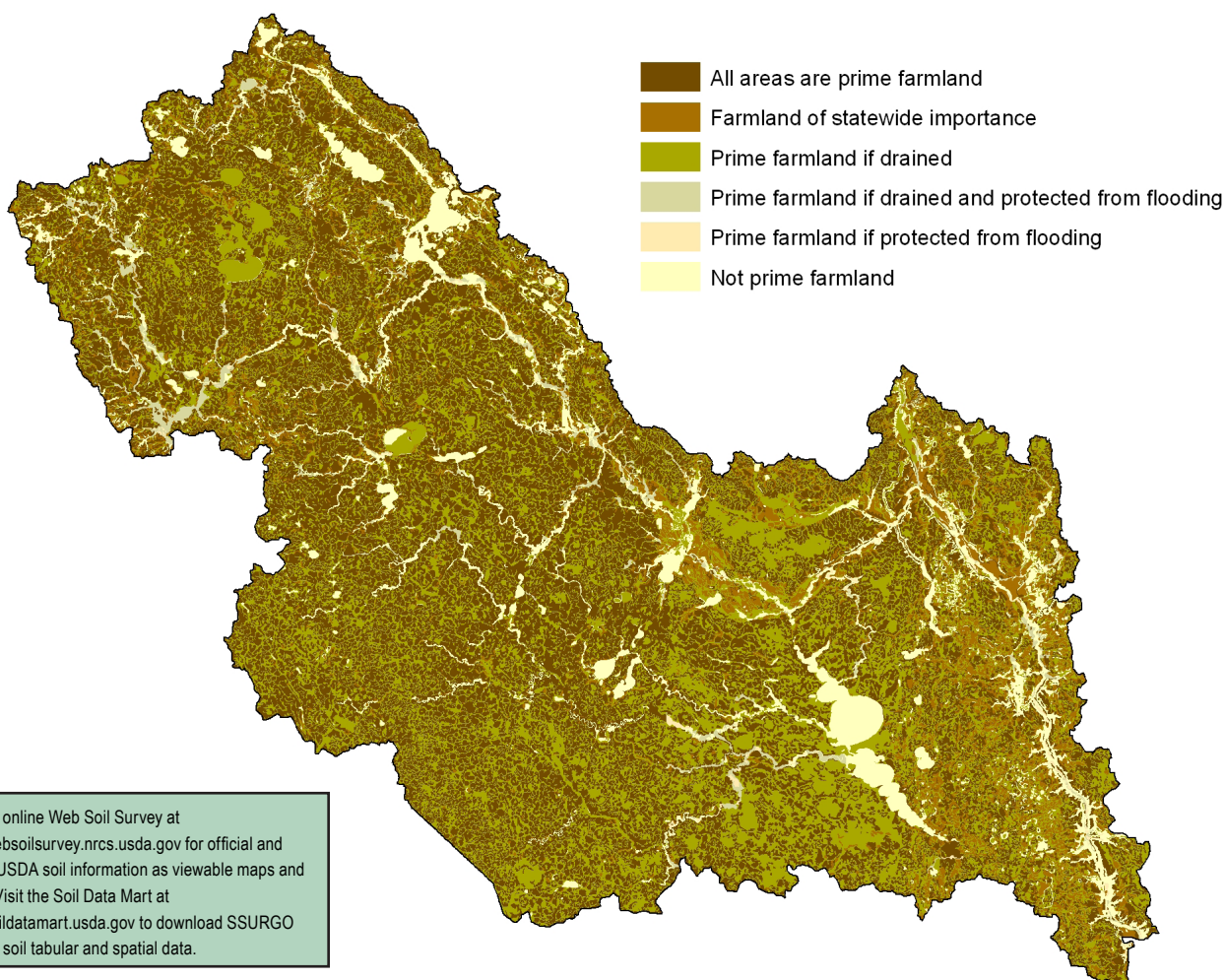
*Note: Historical Soil Determination Standards, scale, and methodology can vary on a county-to-county basis,
 leading to irregularities in thematic maps representing drainage class determinations.*

Farmland Classification

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland.

Farmland classification identifies the location and extent of the most suitable land for producing food, feed, fiber, forage, and oilseed crops.

NRCS policy and procedures on prime and unique farmlands are published in the Federal Register, Vol. 43, No 21, January 31, 1978.

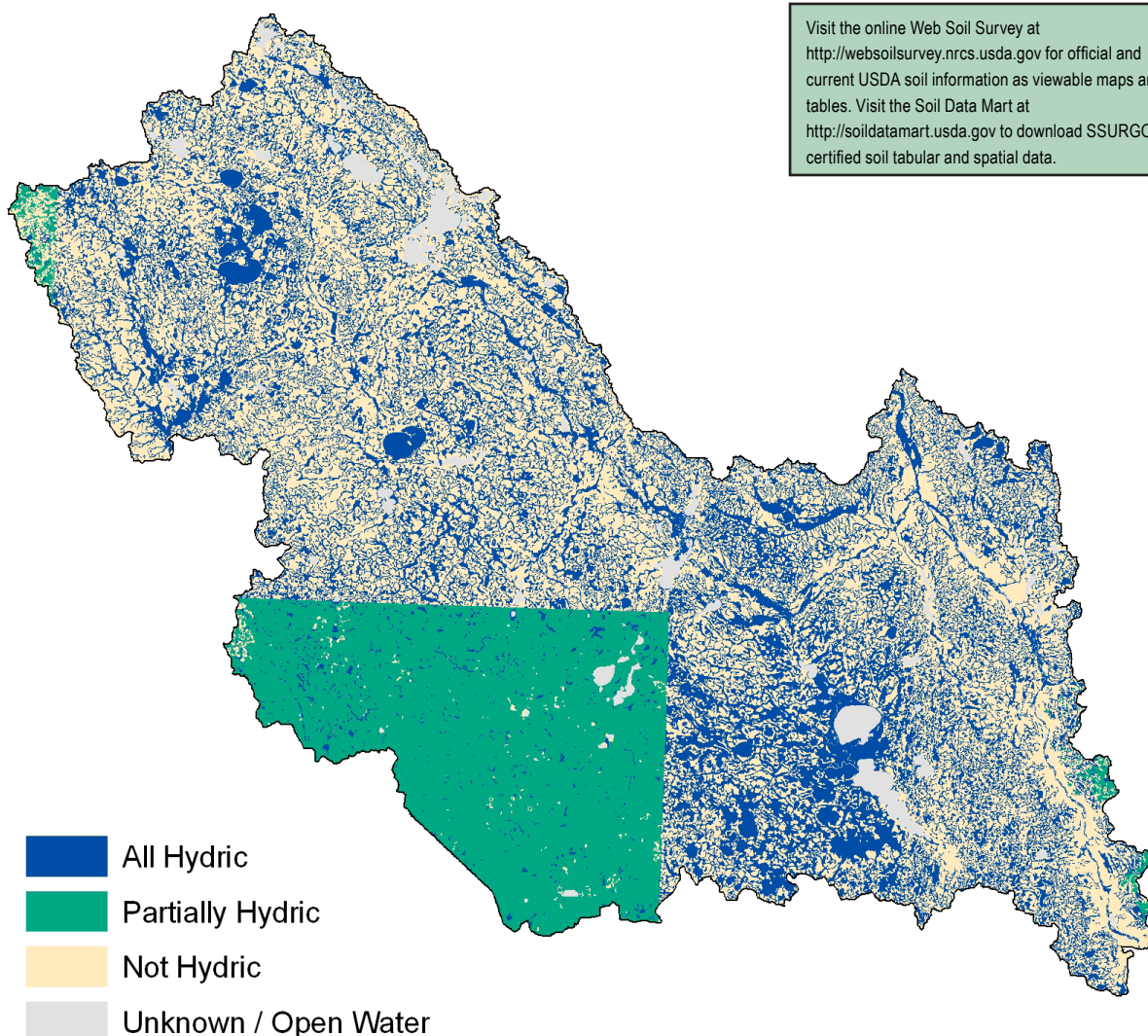


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Hydric Soils

This rating provides an indication of the proportion of the map unit that meets criteria for hydric soils. Map units that are dominantly made up of hydric soils may have small areas, or inclusions of nonhydric soils in the higher positions on the landform. Map units of dominantly non-hydric soils may therefore have inclusions of hydric soils in the lower positions on the landform.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as “soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part” (Federal Register 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.



Note: Historical Hydric Soil Determination Standards, scale, and methodology can vary on a county-to-county basis, leading to irregularities in thematic maps representing hydric soil determinations.

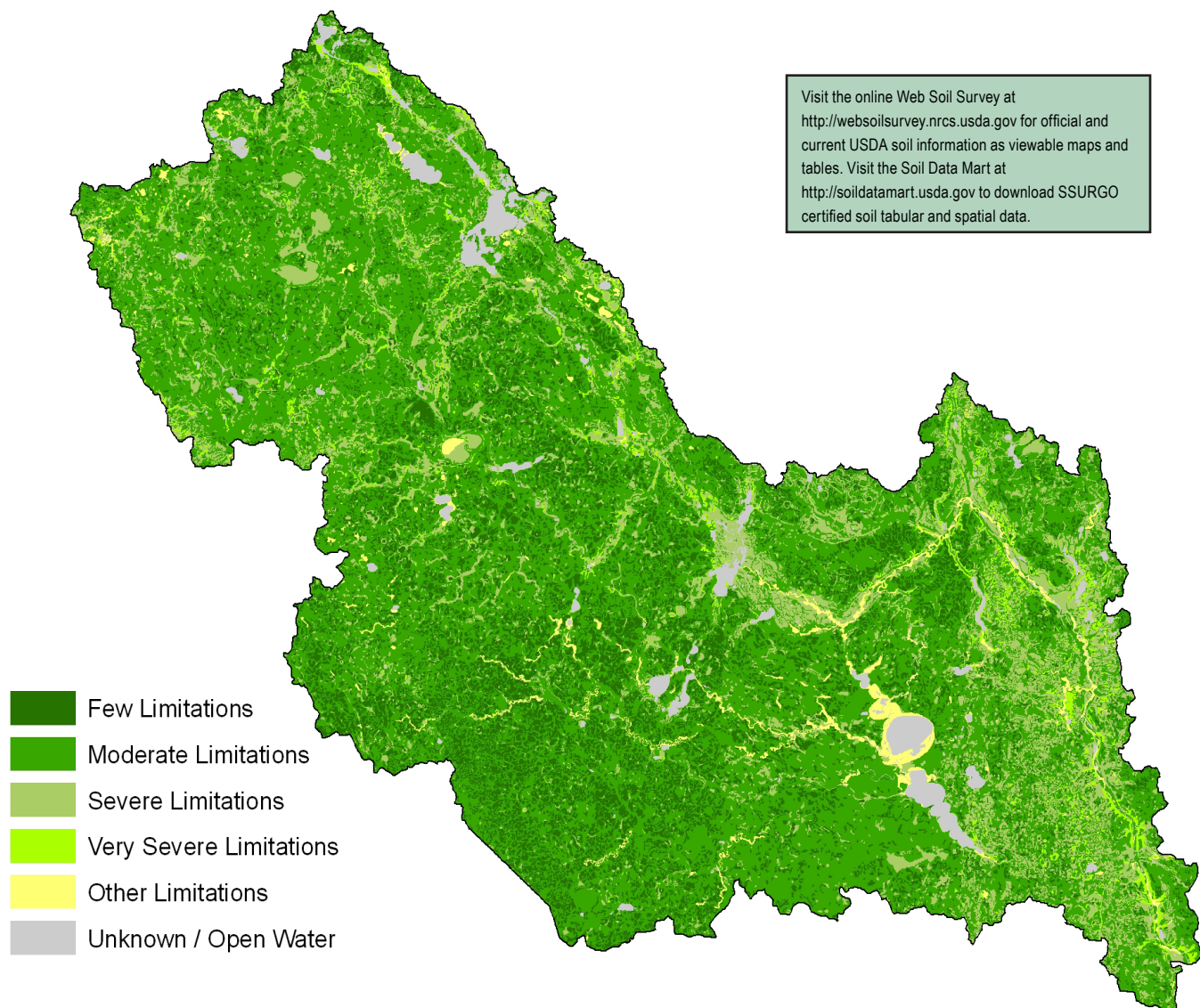
Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management.

The criteria used in grouping the soils does not include major and generally expensive land forming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestland, or for engineering purposes.



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Performance Results System Data

PRS Performance Measures	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	BASIN TOTALS
Total Conservation Systems Planned (acres)	1,166	9,889	0	10,051	12,521	N/A	11,332	16,121	17,645	78,725
Total Conservation Systems Applied (acres)	947	8,606	0	7,482	7,482	N/A	8,705	14,760	18,883	66,865
Conservation Practices										
Total Waste Management (313) (numbers)	100	2	0	0	0	0	0	0	0	102
Riparian Forest Buffers (391) (acres)	0	211	593	127	511	64	55	12	23	1,596
Erosion Control Total Soil Saved (tons/year)	211	57,460	43,824	37,168	38,601	N/A	N/A	N/A	N/A	177,264
Total Nutrient Management (590) (Acres)	196	1,982	1,036	3,024	2,296	3,532	5,491	5,491	5,133	28,181
Pest Management Systems Applied (595A) (Acres)	196	688	532	3,856	1,432	3,765	4,180	3,142	2,853	20,644
Prescribed Grazing 528a (acres)	0	0	0	43	68	0	503	0	0	614
Tree & Shrub Establishment (612) (acres)	0	177	271	178	325	18	7	3	6	985
Residue Management (329A-C) (acres)	0	7,187	4,088	3,066	4,541	1,153	1,153	7,412	5,883	34,483
Total Wildlife Habitat (644 - 645) (acres)	167	3,819	3,186	4,635	1,643	504	4,635	2,340	6,376	27,305
Total Wetlands Created, Restored, or Enhanced (acres)	17	262	66	173	211	4	134	170	567	1,604
Acres enrolled in Farmbill Programs										
Conservation Reserve Program	151	3,329	3,758	4,828	3,446	N/A	1,330	2,459	5,481	24,782
Wetlands Reserve Program	0	96	0	0	0	N/A	160	95	111	462
Environmental Quality Incentives Program	196	1,373	442	956	2,166	N/A	4,161	9,401	9,264	27,959
Wildlife Habitat Incentive Program	0	0	0	0	0	N/A	0	85	33	118
Farmland Protection Program	0	0	0	0	0	N/A	0	0	0	0

THREATENED AND ENDANGERED SPECIES ¹⁴

NRCS assists in the conservation of threatened and endangered species and avoids or prevents activities detrimental to such species. NRCS' concern for these species includes the species listed by the Secretary of the Interior (as published in the Federal Register) and species designated by state agencies. The following is a list of threatened, endangered, and candidate species as well as species of special concern that occur in or near the subbasin.



Scientific Name	Common Name	Type
<i>Actinonaias ligamentina</i>	Mucket	Zoological
<i>Aflexia rubranura</i>	Red Tailed Prairie Leafhopper	Zoological
<i>Agalinis auriculata</i>	Eared False Foxglove	Botanical
<i>Aristida purpurea</i> var. <i>longiseta</i>	Red Three-awn	Botanical
<i>Asclepias sullivantii</i>	Sullivant's Milkweed	Botanical
<i>Atrytone arogos</i>	Arogos Skipper	Zoological
<i>Besseyia bullii</i>	Kitten-tails	Botanical
<i>Buchloe dactyloides</i>	Buffalo Grass	Botanical
<i>Carex festucacea</i>	Fescue Sedge	Botanical
<i>Carex hallii</i>	Hall's Sedge	Botanical
<i>Cypripedium candidum</i>	Small White Lady's-slipper	Botanical
<i>Desmanthus illinoensis</i>	Prairie Mimosa	Botanical
<i>Elliptio dilatata</i>	Spike	Zoological
<i>Eryngium yuccifolium</i>	Rattlesnake-master	Botanical
<i>Gallinula chloropus</i>	Common Moorhen	Zoological
<i>Hesperia dacotae</i>	Dakota Skipper	Zoological
<i>Hesperia ottoe</i>	Ottoe Skipper	Zoological
<i>Larus pipixcan</i>	Franklin's Gull	Zoological
<i>Lespedeza leptostachya</i>	Prairie Bush Clover	Botanical
<i>Limosa fedoa</i>	Marbled Godwit	Zoological
<i>Marpissa grata</i>	A Jumping Spider	Zoological
<i>Oarisma powesheik</i>	Powesheik Skipper	Zoological
<i>Panax quinquefolius</i>	American Ginseng	Botanical
<i>Phalaropus tricolor</i>	Wilson's Phalarope	Zoological
<i>Pleurobema coccineum</i>	Round Pigtoe	Zoological
<i>Rallus elegans</i>	King Rail	Zoological
<i>Rhynchospora capillacea</i>	Hair-like Beak-rush	Botanical
<i>Scleria verticillata</i>	Whorled Nut-rush	Botanical
<i>Speotyto cunicularia</i>	Burrowing Owl	Zoological
<i>Speyeria idalia</i>	Regal Fritillary	Zoological
<i>Sterna forsteri</i>	Forster's Tern	Zoological
<i>Trillium nivale</i>	Snow Trillium	Botanical

RESOURCE CONCERNS

Conservation Districts in the watershed have identified the following resource concerns as top priorities for conservation and cost sharing efforts:

- Sediment and Erosion Control.** Excessive amounts of suspended solids from cropland, urban lands, streambanks and streambeds is a primary threat to area waters. Working hand-in-hand with waste management and prevention plans and nutrient management plans, counties in the watershed seek to retain water on the landscape to reduce flooding and subsequent soil erosion, and improve water resources.

- Drinking Water and Source Water Protection.** Parts of the region are particularly susceptible to groundwater contamination. Ease of infiltration, aging septic systems, abandoned wells and historical tiling practices threaten public drinking water supplies.



- Excessive Wind Erosion, Excessive sheet and rill erosion:** Area districts focus on residue management region wide, restoration of habitat, structural conservation practices. Drained wetlands, topography, and production in flood prone areas create challenges in controlling excessive soil loss each year.

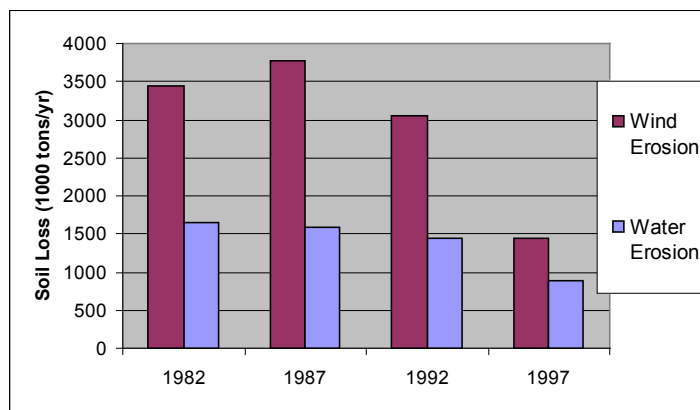
- Feedlot and Animal Waste Management.** Managing farms to minimize excess nutrients, pathogens, and odors released into the environment is important to the health of surface and ground water. Setback of open tile intakes and placement of agricultural waste systems in high priority riparian areas and areas with highly permeable soils will greatly reduce the effects of animal feed operations on area waters.

- Nutrient Management.** Excessive amounts of nutrients, namely phosphorus and nitrogen, contaminate groundwater and create nuisance algae presence in area waters. Major contributors are cropland, urban grasses, municipal wastewater, aging or non-compliant septic systems, and internal cycling.

- Wetland Management.** Due to the historical draining of much of the areas wetlands and homogenic agricultural practices, priority is given to both wetland preservation and restoration. Wetlands that have been filled and drained retain their characteristic soil and hydrology, often allowing their natural functions to be reclaimed. Restoration is a complex process requiring planning, implementation, monitoring, and management.

NRI Soil Loss Estimates ¹³

- NRI estimates for sheet and rill erosion by water on cropland and pastureland **decreased** by approximately 749,000 tons of soil between 1982 and 1997 (45.7%).
- NRI estimates for wind erosion on crop and pastureland **decreased** by 199,900 tons of soil between 1982 and 1997 (58.3%).



Socioeconomic and Agricultural Data (Relevant)

Estimations for the Des Moines Headwaters subbasin indicate a current population of 27,590 people. Median household income throughout the district is approximately \$35,411 annually, roughly 76% of the national average. Unemployment figures for the basin indicate an unemployment rate of 3.7 percent, and approximately 10% of the residents in the watershed are living below the national poverty level.

Assessment estimates indicate 1,661 farms in the watershed. Approximately forty two percent of the operations are less than 180 acres in size, forty eight percent are from 180 to 1000 acres in size, and ten percent of farms are greater than 1000 acres in size. Of the 1,131 operators in the basin, seventy percent are full time producers not reliant on off-farm income.



(MN) HUC# 7100001		Total Acres:	801,772
Population Data*	Watershed Population	27,590	
	Unemployment Rate	3.7%	
	Median Household Income	35,441	
	% below poverty level	10%	
	Median Value of Home	62,917	
Farm Data	# of Farms	1,661	
	# of Operators	1,752	Percent
	# of Full Time Operators	1,318	75%
	# of Part Time Operators	435	25%
	Total NASS Cropland Acres	650,417	81.1%
Farm Size	1 to 49 Acres	37	22%
	50 to 179 Acres	34	20%
	180 to 499 Acres	47	28%
	500 to 999 Acres	33	20%
	1,000 Acres or more	16	10%
	Average Farm Size	125	
Livestock & Poultry	Cattle - Beef	6,550	1%
	Cattle - Dairy	6,261	1%
	Chicken	9,480	1%
	Swine	344,799	38%
	Turkey	81,258	9%
	Other	458,317	51%
	Animal Count Total:	906,666	
	Total Permitted AFOs:	843	
Chemicals (Acres Applied)	Insecticides	61,000	
	Herbicides	397,597	
	Wormicides	9,006	
	Fruiticides	286	
	Total Acres Treated	467,889	
	% State Chemical Totals	3.3%	

* Adjusted by percent of HUC in the county or by percent of block group area in the HUC, depending on the level of data available

Watershed Projects, Plans and Monitoring

- **Basin Alliance for the Lower Mississippi in MN**
(BALMM)
- **Beaver Creek Watershed Improvement Plan**
Murray County SWCD
- **Des Moines Headwaters PL-566**
Natural Resources Conservation Service
- **Des Moines River Clean Water Partnership**
NRCS, Murray County SWCD
- **EPA 319 Alternative Tile Intakes Grant**
U.S. EPA, Nobles, Jackson, Murray, Cottonwood SWCD
- **Heron Lake Clean Water Partnership**
NRCS, Nobles, Jackson, Murray, Cottonwood SWCD
- **Jack Creek PL-566**
Natural Resources Conservation Service
- **Mississippi Source Water Protection Project**
Minnesota Department of Health
- **Mississippi River WS Forest Partnership**
USDA Forest Service
- **Mississippi River Watershed Fund**
USDA Forest Service / National Fish & Wildlife Federation
- **Okabena Creek PL-566**
NRCS, Okabena-Ocheda WD, and Nobles SWCD
- **Well Sealing Incentive Program**
Heron Lake Watershed District

* Have a watershed project you'd like to see included? Submit suggestions online @ <http://www.mn.nrcs.usda.gov/technical/rwa/>

Conservation Districts, Organizations & Partners

- **Basin Alliance for the Lower Mississippi in MN**
18 Wood Lake Drive SE Rochester, MN 55904
Phone (507) 280-3592
- **Cottonwood County SWCD**
339 9th St, Windom, MN 56101
Phone (507) 831-1153
- **Coteau Des Prairies RC&D**
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- **Minnesota Department of Natural Resources**
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- **Minnesota NRCS - USDA**
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- **Murray County SWCD**
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Phone (507) 836-6990
- **Nobles County SWCD**
1567 McMillan St Ste 3, Worthington, MN 56187
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Footnotes / Bibliography

1. Ownership Layer – Source: MN Stewardship Data: Minnesota Department of Natural Resources, Section of Wildlife, BRW, Inc. This is the complete GAP Stewardship database containing land ownership information for the entire state of Minnesota. Date of source material is variable and ranges from 1976 to 2007, although a date range of 1983 to 1985 predominates.
2. National Land Cover Dataset (NLCD) - Originator: U.S. Geological Survey (USGS); Publication date: 20010631; Title: Minnesota Land Cover Data Set, Edition: 1; Geospatial data presentation form: Raster digital data; Publisher: U.S. Geological Survey, Sioux Falls, SD, USA.
3. Ownership layer classes grouped to calculate Public ownership vs. Private and Tribal ownership by Minnesota NRCS Rapid Watershed Assessment Staff. Land cover / Land use data was then extracted from the National Landcover Dataset Classification System and related to ownership class polygons.
4. U.S. Geological Survey National Hydrography Dataset (NHD) 1:100,000-scale Digital Line Graph (DLG) medium resolution hydrography data, integrated with reach-related information from the U.S. Environmental Protection Agency Reach File Version 3.0 (RF3). The Hydro 100k layer was compared to 303(d) data to derive percentage of listed waters.
5. Land Cover / Land Use / Hydro 100k Buffer. Using the 100k Hydrology dataset, All streams within HUC were spatially buffered to a distance of 100 ft. National Landcover Dataset attributes were extracted for the spatial buffer to demonstrate the vegetation and landuse in vulnerable areas adjacent to waterways.
6. Land Capability Class. ESTIMATES FROM THE 1997 NRI DATABASE (REVISED DECEMBER 2000) REPLACE ALL PREVIOUS REPORTS AND ESTIMATES. Comparisons made using data published for the 1982, 1987, or 1992 NRI may produce erroneous results. This is because of changes in statistical estimation protocols and because all data collected prior to 1997 were simultaneously reviewed (edited) as 1997 NRI data were collected. All definitions are available in the glossary. In addition, this December 2000 revision of the 1997 NRI data updates information released in December 1999 and corrects a computer error discovered in March 2000. For more information: <http://www.nrcs.usda.gov/technical/NRI/>
7. 2002 NASS Irrigated Land Estimates. Irrigated land: Land that shows evidence of being irrigated during the year of the inventory or during two or more years out of the last four years. Water is supplied to crops by ditches, pipes, or other conduits. Water spreading is not considered irrigation; it is recorded as a conservation practice. For more information: <http://www.agcensus.usda.gov/>
8. 303(d) Stream data. Minnesota's Final Impaired Waters (per Section 303(d) Clean Water Act), 2006. Data obtained from Minnesota Pollution Control Agency (MPCA). The Minnesota Pollution Control Agency (MPCA) helps protect state water by monitoring quality, setting standards and controlling inputs through the development of TMDL plans. <http://www.pca.state.mn.us/water/tmdl/index.html#maps>.

Footnotes / Bibliography (continued)

9. National Coordinated Common Resource Area (CRA) Geographic Database. A Common Resource Area (CRA) map delineation is defined as a geographical area where resource concerns, problems, or treatment needs are similar. It is considered a subdivision of an existing Major Land Resource Area (MLRA) map delineation or polygon. Landscape conditions, soil, climate, human considerations, and other natural resource information are used to determine the geographic boundaries of a Common Resource Area

10. Soil Survey Geographic Database (SSURGO) Tabular and spatial data obtained from NRCS Soil Data Mart at <http://soildatamart.nrcs.gov>. Publication dates vary by county. Component and layer tables were linked to the spatial data via SDV 5.1 and ARCGIS 9.1 to derive the soil classifications presented in these examples. Addendum and publication dates vary by county.

11. Lands removed from production through farm bill programs. County enrollment derived from the following: CRP Acres: www.fsa.usda.gov/crpstorpt/07Approved/r1sumyr/mn.htm (7/30/04). CREP Acres: <http://www.bwsr.state.mn.us/easements/crep/easementssummary.html> (7/31/03). WRP Acres: NRCS (8/16/04). Data were obtained by county and adjusted by percent of HUC in the county.

12. Socioeconomic and Agricultural Census Data were taken from the U.S. Population Census, 2000 and 2002 Agricultural Census and adjusted by percent of HUC in the county or by percent of zip code area in the HUC, depending on the level of data available. Data were also taken from MPCA AFO/CAFO counts provided by county for 2005.

13. 1997 NRI Estimates for sheet and rill erosion (WEQ & USLE). The NRI estimates sheet and rill erosion together using the Universal Soil Loss Equation (USLE). The Revised Universal Soil Loss Equation (RUSLE) was not used in the 1997 NRI. RUSLE was not available for previous inventories, therefore the use of USLE was continued to preserve the trending capacity of the NRI database. Wind erosion is estimated using the Wind Erosion Equation (WEQ). For further information visit <http://www.mn.nrcs.usda.gov/technical/nri/findings/erosion.htm>

14. Federally listed endangered and threatened species counts obtained from NRCS Field Office Technical Guide, Section II, Threatened and Endangered List. <http://www.nrcs.usda.gov/Technical/efotg/>. Where listed, Essential fish habitat as established by Magnuson-Stevens Fishery Conservation and Management Act, Public Law 94-265, as amended through October 11, 1996 <http://www.nmfs.noaa.gov/sfa/magact/>

15. Watershed Projects, Plans, Monitoring. Natural Resources Conservation Service, Watershed Projects Planned and Authorized, <http://www.nrcs.usda.gov/programs/watershed/Purpose>. Additional Information on listed individual projects can be obtained from the noted parties.